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Small Entity Compliance Guide

Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions

Second Report and Order
GN Docket No. 12-268; ET Docket Nos. 13-26 and 14-14
FCC 14-157
Released October 17, 2014

This Guide is prepared in accordance with the requirements of Section 212 of the Small Business Regulatory Enforcement Fairness Act of 1996. It is intended to help small entities—small businesses, small organizations (non-profits), and small governmental jurisdictions—comply with the new rules adopted in the above-referenced FCC rulemaking docket(s). This Guide is not intended to replace the rules and, therefore, final authority rests solely with the rules. Although we have attempted to cover all parts of the rules that might be especially important to small entities, the coverage may not be exhaustive. This Guide may, perhaps, not apply in a particular situation based upon the circumstances, and the FCC retains the discretion to adopt approaches on a case-by-case basis that may differ from this Guide, where appropriate. Any decisions regarding a particular small entity will be based on the statute and regulations.

In any civil or administrative action against a small entity for a violation of rules, the content of the Small Entity Compliance Guide may be considered as evidence of the reasonableness or appropriateness of proposed fines, penalties or damages. Interested parties are free to file comments regarding this Guide and the appropriateness of its application to a particular situation; the FCC will consider whether the recommendations or interpretations in the Guide are appropriate in that situation. The FCC may decide to revise this Guide without public notice to reflect changes in the FCC's approach to implementing a rule, or to clarify or update the text of the Guide. Direct your comments and recommendations, or calls for further assistance, to the FCC's Consumer Center:

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I. OBJECTIVES OF THE PROCEEDING

In the *Second Report and Order* in GN Docket No. 12-268 and ET Docket Nos. 13-26 and 14-14 (the “Order”),¹ the Commission addressed several outstanding issues related to the forthcoming broadcast television spectrum incentive auction. As explained in the initial *Report and Order* in GN Docket No. 12-268 (*Incentive Auction R&O*),² full power and Class A television broadcasters will have a unique financial opportunity in the “reverse auction” phase to return some or all of their broadcast spectrum usage rights in exchange for incentive payments. A broadcaster’s decision to participate in the reverse auction will be wholly voluntary. By facilitating this voluntary return of spectrum usage rights and reorganizing the broadcast television bands, the Commission can recover a portion of ultra-high frequency (“UHF”) spectrum in the 600 MHz band currently used for television broadcasting for a “forward auction” of new, flexible-use licenses suitable for providing mobile broadband services.

Limits on New Interference in the Repacking Process. In the “repacking process,” the Commission will reorganize the television bands by reassigning stations to new channels to make spectrum available to carry out the forward auction. In the initial *Incentive Auction R&O*, the Commission adopted an approach to preserving population served under which no channel assignment, considered alone, may reduce another station’s specific population served by more than 0.5 percent. In the Order, the Commission addressed and rejected proposals for a cap on aggregate new interference between television stations as result of the repacking process.

ISIX Methodology and Inputs. In the initial *Incentive Auction R&O*, the Commission adopted a flexible band plan framework that accommodates market variation. Market variation occurs where broadcast stations remain on spectrum that is repurposed for wireless broadband under the 600 MHz Band Plan. The Commission explained that accommodating market variation is necessary because the amount of spectrum recovered along the Canadian and Mexican borders and in some markets may vary from that recovered in most markets nationwide. Market variation creates the potential for inter-service interference (ISIX) because, in constrained markets where broadcast television stations are assigned to channels within the 600 MHz Band, television services and wireless services will be operating in close geographic proximity on either the same or adjacent frequencies. In the Order, the Commission established a methodology and associated input values to predict inter-service interference between television and wireless services in certain areas for use during the incentive auction (ISIX Methodology).

¹ *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, ET Docket Nos. 13-26 and 14-14; Second Report and Order and Further Notice of Proposed Rulemaking, 29 FCC Rcd 13071 (2014).

² *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, Report and Order, 29 FCC Rcd 6567 (2014). A Small Entity Compliance Guide for the *Incentive Auction R&O* is available at <http://www.fcc.gov/document/incentive-auctions>.

II. REGULATIONS AND POLICIES THAT THE COMMISSION ADOPTED OR MODIFIED, INCLUDING RECORDKEEPING AND OTHER COMPLIANCE REQUIREMENTS

A. Requested Additional Limits on New Interference in the Repacking Process

In the *Incentive Auction R&O*, the Commission adopted an approach to preserving population served under which no channel assignment, considered alone, may reduce another station's specific population served by more than 0.5 percent. The Commission's rules treat 0.5 percent interference or less as *de minimis* or no new interference, as this amount rounds to zero at integer precision. Under this approach, the Commission considers only station-to-station (or "pairwise") interference when determining whether a particular channel assignment is permissible.

In the Order, the Commission rejected a one-percent cap on aggregate interference, and adopted measures that will effectively address broadcasters' concerns about such interference in exceptional cases where there may be aggregate new interference of more than one percent. The Commission found that the vast majority of stations are unlikely to experience significant new interference as a result of the repacking process. Staff analysis applying the repacking approach adopted in the *Incentive Auction R&O* predicts that the overwhelming majority of stations (approximately 99 percent) will not experience new interference above one percent. In addition to being unnecessary, the Commission found that imposition of an aggregate interference cap would compromise the central objective of a successful auction that allows market forces to determine the highest and best use for spectrum. Speed is critical to the successful implementation of the incentive auction: The repacking methodology must be capable of analyzing complex technical issues fast enough to not unduly slow down the bidding process. The Commission observed that it would be significantly more complicated and, as a result, time-consuming, to consider the amount of aggregate interference from all sources that a station may receive on its provisional channel during the bidding process, as would be necessary to implement a cap on aggregate interference.

The Commission adopted two measures to address exceptional cases where a station is predicted to receive aggregate new interference in excess of one percent. First, it will use optimization techniques that seek to avoid final channel assignments that would result in aggregate new interference of more than one percent. As an additional safeguard, if a station is predicted to receive new interference above one percent on the final channel assigned to it following the repacking process, the Commission will provide it with the opportunity to file an application proposing an alternate channel or expanded facilities in a priority filing window, along with a limited number of other stations that have been assigned the same priority. Taken together, the final channel assignment optimization procedure and post-assignment facilities modification processes will provide a "safety valve" in the exceptional cases where new aggregate interference above one percent has occurred or is likely to occur.

In the Order, the Commission also declined to adopt a cap on any new interference to TV broadcast stations that are currently experiencing ten percent or more interference within their service areas. In addition, consistent with the Commission's decision to use optimization techniques to seek to avoid final channel assignments that would result in aggregate new interference of more than one percent, the Commission will use optimization techniques to seek to avoid final channel assignments that would result in significant viewer losses due to terrain losses.

B. ISIX Methodology and Input Values To Determine 600 MHz Band Wireless License Area Impairments During the Incentive Auction

In the Order, the Commission adopted the ISIX Methodology and input values proposed by its Office of Engineering and Technology in the *ISIX Public Notice (ISIX PN)*,³ with certain modifications, for use during the incentive auction. The ISIX Methodology and input values will be used during the auction to estimate the extent to which 600 MHz Band wireless license areas may be "impaired" due to predicted interference to, or from, broadcast television stations assigned to the 600 MHz Band as a result of market variation. "Impaired" license areas may include "infringed" and/or "restricted" areas. An "infringed" area is one where wireless operation is predicted to receive harmful interference from a television station that is placed in the 600 MHz Band. Wireless licensees will be free to operate in infringed areas, but will assume the risk of receiving interference from a television station. A "restricted" area is one where wireless operations would be predicted to cause harmful interference to a television station that is placed in the 600 MHz Band, depending on how the wireless operations are deployed.

Spectral overlap between broadcast television and wireless services will impact to different degrees the potential for harmful interference between the two services. Under the 600 MHz Band Plan adopted in the *Incentive Auction R&O*, six megahertz broadcast television channels will be repurposed as five megahertz wireless blocks. The difference in channel bandwidth (six vs. five megahertz) means that the wireless spectrum blocks will not perfectly align with the existing television channels and, where market variation exist, there will be varying degrees of spectral overlap between the channels. As the wireless spectrum block moves from complete overlap in frequency with a television channel to an edge-to-edge separation of five megahertz, the level of undesired signal that the victim receiver can tolerate without experiencing interference increases. The Order defines "co-channel operations" as any spectral overlap between a wireless spectrum block and a television channel in one megahertz increments ranging from +5 (complete overlap) to +1 megahertz, and "adjacent channel operations" as a wireless spectrum block and television channel that do not overlap but are separated by less than five megahertz (edge to edge separation of five megahertz or less).

The Order outlines four scenarios of potential interference when broadcast television and wireless operations are co-channel or adjacent channel in nearby markets: (1) Digital television (DTV) transmitter to wireless base station (Case 1); (2) DTV transmitter to wireless user

³ *Office of Engineering and Technology Seeks to Supplement the Incentive Auction Proceeding Record Regarding Potential Interference Between Broadcast Television and Wireless Services*, GN Docket No. 12-268, ET Docket No. 14-14, Public Notice, 29 FCC Rcd 712 (2014) ("*ISIX PN*").

equipment (Case 2); (3) wireless base station to DTV receiver (Case 3); and (4) wireless user equipment to DTV receiver (Case 4).

1. Digital Television to Wireless Interference (Cases 1 and 2)

The Commission adopted the ISIX Methodology and input values as proposed in the *ISIX PN* for use during the incentive auction to predict interference from DTV transmitters to wireless base stations (Case 1) and to wireless user equipment (Case 2), except that it will not consider clutter loss for Case 2. The Commission determined that considering clutter loss in Case 2 would not improve the accuracy of the ISIX Methodology.

The Commission also adopted the proposed F(50,50) statistical measure to predict the strength of an interfering television signal within the wireless license area for Cases 1 and 2, rather than the F(50,10) measure advocated by broadcasters. The F(50,50) measure assumes that the DTV signal will be strong enough to interfere with the wireless base station or wireless user equipment in 50 percent of the locations within the wireless license area 50 percent of the time; the F(50,10) measure would assume that the interfering signal will be strong enough to interfere in 50 percent of the locations just 10 percent of the time. The Commission concluded that the F(50,50) measure is more appropriate for use in predicting interference from DTV signals to wireless operations during the auction. First, the F(50,50) measure will not risk harming broadcasters because it will be applied only during the incentive auction and only to predict interference to wireless operations from television stations for auction-related purposes, not to protect television signals. Second, the majority of wireless providers, who have the greatest stake in the accuracy of predicted inter-service interference to wireless operations, support use of the F(50,50) measure, supporting the conclusion that it will provide a reasonably accurate assessment of such interference. Third, use of the F(50,50) measure is appropriate in this context because various techniques are available to wireless operators to avoid harmful interference to wireless base stations that are not available to television stations or viewers.

2. Wireless Base Station to Digital Television Receiver (Case 3)

The Commission adopted the ISIX Methodology and input values as proposed in the *ISIX PN* for use during the incentive auction to predict interference from wireless base stations to DTV receivers (Case 3), except that: (1) the Commission adopted slightly higher desired to undesired (D/U) signal ratios (by 1 dB) for co-channel operations, based on the measurements conducted by the staff and the Consumer Electronics Association (CEA); and, (2) the Commission will not consider clutter loss.

The Commission concluded that the record supports the D/U ratios proposed in the *ISIX PN* for adjacent channel interference based on the measurements conducted by staff and CEA. However, based on the measurement data, LTE signals create slightly more co-channel interference to DTV reception than other DTV signals. The Commission concluded that the D/U ratios proposed in the *ISIX PN* for co-channel interference should be increased by 1dB from 15 dB to 16 dB in light of these data. The Commission did not adopt the proposed use of clutter loss for Case 3 for reasons similar to those set forth above with regard to Case 2. Clutter loss has not been used in the context of interference between television stations, and the Commission

concluded that application of a single clutter value in a four-square kilometer area would not improve the accuracy of the ISIX Methodology. The Commission will use the Longley-Rice propagation model for Case 3. The Commission has relied on the Longley-Rice model to predict television coverage and interference for more than fifteen years, and that model is widely accepted for use at the frequencies in the 600 MHz Band. For purposes of the auction, the ISIX Methodology assumes an Effective Radiated Power level of 120 W/MHz for a wireless base station. The antenna Height Above Average Terrain value of 30 meters adopted for use in the ISIX Methodology is consistent with real-world network information incorporated in the Commerce Spectrum Management Advisory Committee Final Report.

3. Wireless User Equipment to Digital Television Receiver (Case 4)

The Commission adopted fixed geographic separation distances for Case 4, because it involves short distances only. Specifically, wireless user equipment (*i.e.*, mobile and portable devices) will be prohibited from co-channel or adjacent-channel operations within a television station's contour and within a set distance from the station's contour. The Commission determined that the appropriate distance is five kilometers for co-channel operations, and one-half kilometer for adjacent-channel operations.

III. RECORDKEEPING AND OTHER COMPLIANCE REQUIREMENTS

While the Commission in the Order declined to adopt an aggregate cap on new interference between television stations as result of the repacking process, it adopted measures to address exceptional cases where a station is predicted to receive aggregate new interference in excess of one percent. One of these measures allows a station predicted to receive new interference above one percent on its final channel assignment to file an application proposing an alternate channel or expanded facilities in a priority filing window. This opportunity will be available to any station entitled to protection in the repacking process that is predicted to experience aggregate new interference in excess of one percent, regardless of whether that station was reassigned to a new channel in the repacking process.

IV. INTERNET LINKS

Second Report and Order and Further Notice of Proposed Rulemaking

- https://apps.fcc.gov/edocs_public/attachmatch/FCC-14-157A1.docx
- https://apps.fcc.gov/edocs_public/attachmatch/FCC-14-157A1.pdf
- https://apps.fcc.gov/edocs_public/attachmatch/FCC-14-157A1.txt